

What is claimed is:

1. An image scanning lens comprising, in order from the object side with no intervening lens element:

a first lens component having positive refractive power and a meniscus shape with its convex surface on the object side and including a first lens element having positive refractive power and a meniscus shape with its convex surface on the object side;

a second lens component having a biconcave shape and including a second lens element having a biconcave shape;

a third lens component having a biconvex shape and including a third lens element having a biconvex shape;

a fourth lens component having negative refractive power and a concave surface on the object side and including a fourth lens element having negative refractive power and a concave surface on the object side;

wherein the following conditions are satisfied:

$$\theta_{gd} > -2.083 \cdot 10^{-3} \cdot v_d + 1.366 \text{ for said first lens element,}$$

$$\theta_{gd} < -2.083 \cdot 10^{-3} \cdot v_d + 1.364 \text{ for at least one of said second lens element and said fourth lens element,}$$

where

v_d is the Abbe number at the d-line (587.56 nm) of the lens material of the lens element being considered, and

$$\theta_{gd} = (N_g - N_d) / (N_F - N_C)$$

where

N_g is the refractive index at the g-line ($\lambda = 435.83$ nm) of the lens material of the lens element being considered,

N_d is the refractive index at the d-line ($\lambda = 587.56$ nm) of the lens material of the lens element being considered,

N_F is the refractive index at the F-line ($\lambda = 486.13$ nm) of the lens material of the lens element being considered, and

28 N_C is the refractive index at the C-line ($\lambda = 656.27$ nm) of the lens material of the
29 lens element being considered.

1 2. The image scanning lens of claim 1, wherein each of said first lens component, said second
2 lens component, said third lens component, and said fourth lens component is formed of a single
3 lens element.

1 3. The image scanning lens of claim 1, wherein the image scanning lens is formed of only four
2 lens components.

1 4. The image scanning lens of claim 3, wherein each of said first lens component, said second
2 lens component, said third lens component, and said fourth lens component is formed of a single
3 lens element.

1 5. The image scanning lens of claim 1, wherein said fourth lens element is a biconcave lens
2 element and the second lens element is made of a material that satisfies the condition
3 $\theta_{gd} < -2.083 \cdot 10^{-3} \cdot v_d + 1.364$.

1 6. The image scanning lens of claim 5, wherein the following conditions are satisfied:

2 $0.45 < f_1 / f < 0.66$

3 $0.36 < |f_2| / f < 0.40$

4 $0.31 < |f_4| / f < 0.52$

5 where

6 f_1 is the focal length of said first lens component,

7 f_2 is the focal length of said second lens component,

8 f_4 is the focal length of said fourth lens component, and

9 f is the focal length of the image scanning lens.

1 7. The image scanning lens of claim 2, wherein said fourth lens element is a biconcave lens
2 element and the second lens element is made of a material that satisfies the condition
3 $\theta_{gd} < -2.083 \cdot 10^{-3} \cdot v_d + 1.364$.

8. The image scanning lens of claim 7, wherein the following conditions are satisfied:

$$0.45 < f_1 / f < 0.66$$

$$0.36 < |f_2| / f < 0.40$$

$$0.31 < |f_4| / f < 0.52$$

where

f_1 is the focal length of said first lens component,

f_2 is the focal length of said second lens component,

f_4 is the focal length of said fourth lens component, and

f is the focal length of the image scanning lens.

9. The image scanning lens of claim 3, wherein said fourth lens element is a biconcave lens element and the second lens element is made of a material that satisfies the condition

$$\theta_{gd} < -2.083 \cdot 10^{-3} \cdot v_d + 1.364.$$

10. The image scanning lens of claim 9, wherein the following conditions are satisfied:

$$0.45 < f_1 / f < 0.66$$

$$0.36 < |f_2| / f < 0.40$$

$$0.31 < |f_4| / f < 0.52$$

where

f_1 is the focal length of said first lens component,

f_2 is the focal length of said second lens component,

f_4 is the focal length of said fourth lens component, and

f is the focal length of the image scanning lens.

11. The image scanning lens of claim 4, wherein said fourth lens element is a biconcave lens element and the second lens element is made of a material that satisfies the condition

$$\theta_{gd} < -2.083 \cdot 10^{-3} \cdot v_d + 1.364.$$

12. The image scanning lens of claim 11, wherein the following conditions are satisfied:

$$0.45 < f_1 / f < 0.66$$

3 $0.36 < |f_2| / f < 0.40$

4 $0.31 < |f_4| / f < 0.52$

5 where

6 f_1 is the focal length of said first lens component,

7 f_2 is the focal length of said second lens component,

8 f_4 is the focal length of said fourth lens component, and

9 f is the focal length of the image scanning lens.

1 13. The image scanning lens of claim 1, wherein the following conditions are satisfied:

2 $0.45 < f_1 / f < 0.98$

3 $0.34 < |f_2| / f < 0.40$

4 $0.31 < |f_4| / f < 0.56$

5 where

6 f_1 is the focal length of said first lens component,

7 f_2 is the focal length of said second lens component,

8 f_4 is the focal length of said fourth lens component, and

9 f is the focal length of the image scanning lens.

1 14. The image scanning lens of claim 2, wherein the following conditions are satisfied:

2 $0.45 < f_1 / f < 0.98$

3 $0.34 < |f_2| / f < 0.40$

4 $0.31 < |f_4| / f < 0.56$

5 where

6 f_1 is the focal length of said first lens component,

7 f_2 is the focal length of said second lens component,

8 f_4 is the focal length of said fourth lens component, and

9 f is the focal length of the image scanning lens.

1 15. The image scanning lens of claim 3, wherein the following conditions are satisfied:

2 $0.45 < f_1 / f < 0.98$

3 $0.34 < |f_2| / f < 0.40$

4 $0.31 < |f_4| / f < 0.56$

5 where

6 f_1 is the focal length of said first lens component,

7 f_2 is the focal length of said second lens component,

8 f_4 is the focal length of said fourth lens component, and

9 f is the focal length of the image scanning lens.

1 16. The image scanning lens of claim 4, wherein the following conditions are satisfied:

2 $0.45 < f_1 / f < 0.98$

3 $0.34 < |f_2| / f < 0.40$

4 $0.31 < |f_4| / f < 0.56$

5 where

6 f_1 is the focal length of said first lens component,

7 f_2 is the focal length of said second lens component,

8 f_4 is the focal length of said fourth lens component, and

9 f is the focal length of the image scanning lens.

1 17. The image scanning lens of claim 1, in combination with an image scanning device that
2 includes an image pickup device for receiving an image formed by the image scanning lens.

1 18. The image scanning lens of claim 2, in combination with an image scanning device that
2 includes an image pickup device for receiving an image formed by the image scanning lens.

1 19. The image scanning lens of claim 3, in combination with an image scanning device that
2 includes an image pickup device for receiving an image formed by the image scanning lens.

1 20. The image scanning lens of claim 4, in combination with an image scanning device that
2 includes an image pickup device for receiving an image formed by the image scanning lens.